

Challenges And Strength: A Scoping Review On Online Assessment Practices In Healthcare Professions

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Abstract

Objective: The objective of this scoping review is to carry out a systemic search of published articles to identify and explore the strengths and challenges encountered by students, teachers, and administrative staff in the realm of online assessment, particularly in the context of the ongoing challenges posed by the Coronavirus pandemic, taking into consideration the needs and requirements in online education.

Method: This review adhered to the Arksey and O'Malley framework, incorporating data from four databases. It focused on studies related to online assessment during and after the COVID-19 pandemic within the past three years. A total of 11 articles met the inclusion criteria, and the QualSyst appraisal tool was applied for methodological assessment. The synthesis of data resulted in the presentation of findings, reflecting the contemporary evolution of online assessment methodologies.

Result: Diverse challenges and strengths associated with online assessment were identified and categorized based on the roles of students, teachers, and administrative staff. Students faced challenges like internet connectivity and distractions, while faculty dealt with increased screen time and invigilation difficulties. Similarly, administrative staff had a heavier workload, however, students appreciated transparency, faculty valued reduced marking loads, and IT staff saw fewer cheating chances and the benefit of recording availability for review.

Conclusion: This scoping review serves as a valuable resource for medical schools, offering insights into the challenges and strengths of online assessment during and post the COVID-19 pandemic. The adaptation of diverse modalities is poised to enhance the popularity and effectiveness of online assessment in the future years.

Keywords: E-learning, Digital evaluation, Online assessment, Synchronous, Asynchronous.

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1. Introduction

The ongoing impact of the COVID-19 pandemic has reshaped societal trends and disrupted conventional routine practices. In the realm of medical education, the constraints imposed by social distancing have prompted transformative changes, necessitating innovative approaches for both teaching and assessment methodologies.¹ The imperative shift towards online education and assessment systems has become integral, demanding inventive measures to provide intellectually enriching and interactive learning experiences in the digital landscape, catering to the expectations of millennial students.²

Throughout the pandemic, diverse online assessment mechanisms have been developed and implemented in medical education, evolving continuously. Both synchronous and asynchronous methods are employed,³ offering flexibility in assessment

approaches. Synchronous assessments, occurring in real-time and at a single location, provide a time-bound setting for student responses. Conversely, asynchronous assessments allow unlimited time and are conducted at multiple locations for enhanced student convenience.

Various assessment modalities, such as open-ended short answer questions, oral/viva, problem-solving questions, and recorded objective structured clinical exams (OSCE), are utilized in asynchronous environments. In synchronous settings, assessment methods include MCQs, EMQs, close-ended short-answer questions, and true/false questions are used.² To ensure the integrity of these assessment modalities, surveillance measures involving audio and video recordings are systematically implemented.

As a scientific discipline demanding specific and skill-based professional content, medical education requires a productive assessment framework.

Educators must employ appropriate methods to gauge students' progress, crucial for their success. The continuous evolution of assessment systems, especially the transition from traditional to diverse online methodologies, has presented challenges to teaching faculty, students, and administrative staff across universities.

This scoping review aims to offer an in-depth evaluation of current online assessment methodologies in medical education, exploring modalities suitable for both synchronous and asynchronous modes. Additionally, it seeks to identify and address the challenges faced by all stakeholders in the evolving landscape of online assessment, providing insights relevant to the latest trends and future developments in this field.

2. Materials & Methods

The study is literature-based, hence approval from the college review board was not sought. Studies included in the review were gathered from various databases. Employing the Arksey and O'Malley (2005) framework, a widely utilized strategy for synthesizing research evidence, this review utilized four bibliographic databases, namely PubMed, Google Scholar, ERIC, and PakMedinet, to map the published literature and address the research question. Conducted as a systematic scoping review following the PRISMA-ScR and Protocol guidelines⁴, the research utilized an electronic database strategy with key concepts related to the review question. Two independent reviewers systematically searched PubMed, Google Scholar, ERIC, and PakMedinet using terms such as "online assessment in medical education" and "challenges faced by students/faculty in online assessment." The focus was on health profession education, and the research utilized electronic data collection methods.

This review specifically examined studies on online assessment in the health profession during and after the COVID-19 pandemic, limiting the inclusion to the last two to three years (2020-2022) to align with contemporary online technology use. Non-medical articles related to online education techniques for online assessment were excluded. This review ensures a

meticulous exploration of pertinent studies within the specified timeframe, offering valuable insights into the changing prospect of assessment in the field of medical education.

Study Selection:

Two reviewers analyzed the identified studies based on the eligibility criteria given in the table below. The selected articles for the study were all full texts which were independently scrutinized for eligibility by both reviewers. In instances of uncertainty, a decision was made on mutual consensus. PRISMA flowchart was formulated to report the results of the number of articles after applying the eligibility criteria. 852 articles were identified through electronic databases by using the keywords. Duplicate studies were omitted during research and thereafter 11 full-text articles were selected and incorporated in the study.

Inclusion Criteria	Exclusion Criteria
Full-text article	Abstracts
Studies done in Medical & Dental students	Studies done in other than health profession
Last 2-3 years of studies (2020-2022)	Articles in languages other than English
Articles in English language	Book chapters
Published research work	Newspaper articles
Papers on online assessment	Unpublished research work
Short communication/Review articles	Papers on traditional assessment

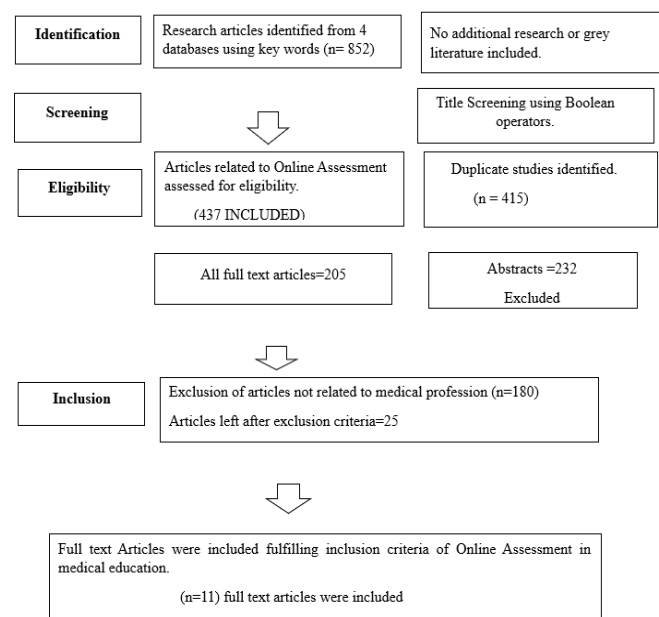


Figure 1: Prisma Flow Chart

Table 1: Table of Studies Included in Scoping Review

Assessment Tools	Challenges		
	Students	Teacher/ IT Administration	Strengths
Fatima SS, Idrees R, Jabeen K, Sabzwari S, Khan S. Online assessment in undergraduate medical education: Challenges and solutions from an LMIC university¹.			
<ul style="list-style-type: none"> • MCQs, • EMQs, • Short answer questions 	<ol style="list-style-type: none"> 1. Incompatibility of computers/laptops with college software 2. Bandwidth issues with images and videos 3. Power failures 	<ol style="list-style-type: none"> 1. Technical failure. 2. Lack of technology experience. (Administration/IT) 1. Students/faculty training. 2. Teams creation and monitoring for websites. 3. Creation of unique passwords. 	<ol style="list-style-type: none"> 1. Immediate Feedback. 2. Reduce checking load. 3. Easy scanning for a large class 4. Proctoring in a controlled environment
Sadeesh T, Prabavathy G, Ganapathy A. Evaluation of undergraduate medical students' preference to human anatomy practical assessment methodology: a comparison between online and traditional methods⁵.			
<ol style="list-style-type: none"> 1. Anatomy Spotters exam: 15 prosecuted specimen images, 5 histology images 2. Gross anatomy Viva via ZOOM 	<ol style="list-style-type: none"> 1. Poor resolution in assessment images 2. 50% of students uncomfortable with protected specimen images 3. 40% prefer traditional methods over online image-based anatomy viva 	Not specified	50% of students favoured the online Anatomy spotter exam for its ease.
Gupta, Madan Mohan; Jankie, Satish; Pancholi, Shyam Sundar; Talukdar, Debjyoti; Sahu, Pradeep Kumar. Asynchronous Environment Assessment: A Pertinent Option for Medical and Allied Health Profession Education during the COVID-19 Pandemic².			
Asynchronous	<ol style="list-style-type: none"> 1. No live interaction. 2. Chances of miscommunication. 3. Limited feedback. 4. Challenges in self-learning. 4. Lack of formative assessment. 	<ol style="list-style-type: none"> 1. Challenges in the scheduling of an exam. 2. Internet Issues. 	<ol style="list-style-type: none"> 1. Self-paced learning. 2. Available videos to the user. 3. Accessibility of learning material of the course.
Synchronous	<ol style="list-style-type: none"> 1. Network issues. 2. Difficulty in assessing accomplishment of learning outcomes of assessment. 	Network issues.	<ol style="list-style-type: none"> 1. Immediate feedback & motivation. 2. Enhanced student networking. 3. Real-time interaction of students with peers & teachers.
Snekalatha S, Marzuk SM, Meshram SA, Maheswari KU, Sugapriya G, Sivasharan K. Medical students' perception of the reliability, usefulness and feasibility of un-proctored online formative assessment tests⁶.			
<ol style="list-style-type: none"> 1. MCQs 2. Problem-based questions 3. Structured questions. 4. Viva voce by video conferencing 	<ol style="list-style-type: none"> 1. Network issues. 2. Distracting home environment. 3. Difficulty in adherence to schedule. 	Connectivity issues	<ol style="list-style-type: none"> 1. Student motivation by timely feedback. 2. Less stressful than classroom tests
Morgan, K., Adams, E., Elsobky, T., Darr, A., & Brackbill, M. (2021). Moving assessment online: Experiences within a school of pharmacy⁷.			
Comparison of open-book, (un-proctored) internet access exam V/S close-book (proctored) exam with no access to the internet.	<ol style="list-style-type: none"> 1. Stability & reliability of the internet. 2. Background noises and distractions. 	Extensive instruction & training for both students and proctors.	Comfortable & less stressful un-proctored exams.
Elzainy A, El Sadik A, Al Abdulmonem W. Experience of e-learning and online assessment during the COVID-19 pandemic at the College of Medicine, Qassim University⁸.			
<ol style="list-style-type: none"> 1. Formative Assessment 1. Online PBL for enhanced critical thinking. 2. Use of SWOT Analysis. 	Challenges to assess knowledge/skills & effectiveness of online assessment	<ol style="list-style-type: none"> 1. Staff resistance and lack of technology experience in e-learning. 2. Insufficient IT staff. 	Students' motivation due to Online continuous assessment in the form of quizzes.
Mondal H, Sahoo MR, Samantaray R, Mondal S. Medical students' perception on the usefulness of online formative assessment: A single-centre, mixed-method, pilot study⁹.			
Formative Assessment with 5 MCQs	<ol style="list-style-type: none"> 1. 80% Students used mobile phones. 2. Technical issues faced by students were not mentioned. 	Not Defined	Feedback on weaknesses in learning helped in the motivation of students to further study the topic.
Baqir SM, Mustansir F. Online Medical Education and Examinations during COVID-19: Perspectives of a Teaching Associate¹⁰.			
Formative exam through video conferencing	Not identified	Training of teachers as proctors.	<ol style="list-style-type: none"> Reduce checking load on teachers. Secure and unbiased results are available due to computerized checking.
Jaam M, Nazar Z, Rainkie DC, Hassan DA, Hussain FN, Kassab SE, Agouni A. Using Assessment Design Decision Framework in understanding the impact of a rapid transition to remote education on student assessment in health-related colleges¹¹.			
Open-book exams were preferred to closed-book exams.	Not prepared for a different type of exam	Difficult to maintain validity & integrity of online assessment. Added workload.	Formulation of assessment Design Decision framework (ADDF) to evaluate assessment.
Papapanou M, Routsis E, Tsamakidis K, Fotis L, Marinos G, Lidoriki I, Karamanou M, Papaioannou TG, Tsiptsios D, Smyrnis N, Rizos E, Schizas D. Medical education challenges and innovations during COVID-19 pandemic¹².			
Use of an open-book exam. Sequences of questions are randomized for each student to avoid cheating.	Not clearly defined.	Not Defined.	<ol style="list-style-type: none"> Reduces exam-related anxiety in medical students. Enhance critical thinking and Self-directed learning
Khalaf K, El-Kishawi M, Moufti MA, Al Kawas S. Introducing a comprehensive high-stake online exam to final-year dental students during the COVID-19 pandemic and evaluation of its effectiveness¹³.			
<ol style="list-style-type: none"> OSCE MCQs MEQs Oral exam. 	<ol style="list-style-type: none"> 1. Network issues. 2. Insufficient time for MEQ essay answer. 3. Cannot go back to previous MCQs before final submission of the test. 4. Noisy environment while using MS Teams during exams. 	<ol style="list-style-type: none"> 1. Poor internet quality leading to technical faults. 2. More time and effort are required in preparing for online exams. 3. Faculty training and IT support. 	<ol style="list-style-type: none"> Reduce checking load on teachers. Reduce the level of Anxiety in oral exams.

Table 2: Inter-rater reliability assessment of the studies by Qualsyst

Study design	Rater name	Total score	%	Agreement Cohen Kappa value	Q
Quantitative Cross-sectional	MN	16/20	80	Near perfect	H
	HF	17/20	85	0.876	H
Mixed method quantitative	MN	16/22	72	perfect	G
	HF	16/22	72	1.00	G
Mixed method qualitative	MN	15/20	75	perfect	G
	HF	15/20	75	1.00	G
Narrative review	MN	15/16	93	Near perfect	H
	HF	14/16	87	0.878	H
Quantitative	MN	16/20	80	substantial	H
	HF	19/20	95	0.656	H
Qualitative	MN	17/20	85	Near perfect	H
	HF	18/20	90	0.873	H
Descriptive cross-sectional	MN	19/20	95	Near perfect	H
	HF	18/20	90	0.868	H
Cross-sectional observational	MN	17/20	85	substantial	H
	HF	17/20	85	0.761	H
Mixed method quantitative					
Mixed method qualitative	MN	16/20	80	Near perfect	H
	HF	15/20	75	0.891	G
Viewpoint analysis /short communication -qualitative	MN	14/16	87	substantial	H
	HF	12/16	75	0.781	G
Qualitative Thematic analysis	MN	18/20	90	substantial	H
	HF	17/20	85	0.644	H
Review article- qualitative	MN	10/12	83	substantial	H
	HF	9/12	75	0.632	G
Descriptive- quantitative	MN	19/20	95	Perfect	H
	HF	19/20	95	1.00	H

Key:

- Article quality grading (Q): H=High>80%, Good= 71-79%, Sufficient = 50-70%, Borderline/limited = <50%.
- Cohen's kappa value & agreement level= <0 no agreement,0-0.20 slight,0.21-0.40 fair,0.41-0.60 Moderate,0.61-0.80 substantial,0.81-1 near perfect/perfect

For assessing the quality of the above-selected articles, a QualSyst tool was utilized. The validated QualSyst contains 14-item criteria for quantitative studies and 10-item criteria for qualitative studies.¹⁴ The 11 articles selected for the scoping review had a score >50%. A three-point scale score was attributed to each item in the study (0 = NA, 1 = Partial present, 2 = Present), leading to a maximum 28 score for quantitative (14x2) and 20

(10x2) for qualitative studies respectively. To obtain the final score of the study, the total score attained was divided by either 28 or 20 or as applicable. The final score was categorized as high (> 80%), good (71–79%), sufficient (50–70%), and limited quality (< 50%). Studies obtaining >50% score were incorporated in the review.

3. Results

The articles included originated from various countries like Pakistan, India, USA, Australia, Greece, Qatar, UAE and Egypt. 50% of the studies included in this scoping review revealed that the most commonly reported challenges were related to internet connectivity and non-conducive home environment, 20% was lack of technology experience, 10% increased workload, 10% inability to assess effectiveness of online assessment and 10% training of teachers as proctors. All 11 articles were reviewed by both the reviewers and data was analyzed critically to identify various challenges and strengths related to online assessment experienced by the students, teachers and administrative staff were as follows. Assessment is an important and core component of learning.¹⁵ The challenges and strengths outlined in the scoping review provide valuable insights into the dynamics of online assessments. By delving into these challenges and strengths, educators and institutions can gain valuable insights into the existing gaps in the current challenging situation for online assessments. The predominant concern among students overwhelmingly centres on issues related to internet connectivity during the administration of online exams.² Additionally, they have noted that the home environment is non-conducive and unsuitable for effective online assessments.⁶ The introduction of various lockdown browsers has introduced a new set of challenges, manifesting as laptop slowdowns, freezing, and connectivity discrepancies. These issues are particularly pronounced among students residing in rural areas as opposed to urban counterparts.² Asynchronous assessment methods have presented hurdles such as miscommunication, misunderstandings, and lack of direct feedback due to the absence of real-time communication between students and facilitators.² Noteworthy is the problem of background noises and

distractions stemming from other students during online exams, further compounded by the pervasive anxiety and stress experienced both before and during the examination process.⁷

Students	
Challenges	Strengths
Logistical issues, including non-availability of devices and continuous internet connection.	Immediate feedback on performance for motivation and improvement.
Loss of connectivity/internet issues during online assessment exams.	Greater tracking and transparency due to computer-based marking.
Lack of a separate quiet space at home required for exams.	
Household distractions affecting concentration during exams.	
Difficulty in understanding and using various software for exams.	
Faculty	
Challenges	Strengths
Difficulty in creating assessments that stimulate critical thinking.	Reduced marking load on faculty with computer-based marking.
Challenges in online invigilation leading to increased screen time.	Quick review of results by faculty if challenged by students.
Technical failures or loss of internet connection causing stress.	
Internet slowing down during exams causing stress.	
Longer exam duration due to technical issues.	
Administrative Staff	
Challenges	Strengths
Increased burden on administrative staff in training students and faculty.	Computerized and camera-visualized exams reduce the chances of cheating.
Creation of unique passwords for secure exams.	Recorded exams provide transparency and accountability for result-related issues.
Resolution of technical issues during exams.	

4. Discussion

Proposing a potential solution, students advocate for oral exams conducted through video conferencing, perceiving them as a more suitable and reliable mode that diminishes the likelihood of cheating.⁶

A critical appraisal reveals that students are calling attention to the imperative need for enhancements in online assessment modalities. Their suggestions, aimed at increasing the reliability and feasibility of various assessment tools, emphasize the potential for these tools to serve both formative and summative assessment purposes. The challenges voiced by students underscore the multifaceted nature of issues in the online assessment landscape, emphasizing the urgency for comprehensive improvements to foster an environment conducive to fair and effective evaluation.

The online assessment posed considerable challenges for both faculty and administrative staff primarily because these online technologies were novel for the faculty. The burden on administrative and IT staff increased significantly as they undertook extra responsibilities to train faculty and students in utilizing various innovative online assessment tools. Faculty members found themselves expending additional effort, dedicating extra time to craft online assessments that aimed at fostering critical thinking and problem-solving skills, diverging from the simpler task of knowledge recall. The dual responsibilities of crafting new exam questions and actively proctoring during examinations placed a substantial workload on faculty members. This dual role aimed not only to prevent instances of cheating but also to ensure that the examination process remained fair, reliable, transparent, and accountable. In this regard, the administrative staff played a pivotal role in providing active invigilation support and affirming the identity of candidates. The collaboration extended to IT staff, who were tasked with generating unique and confidential passwords for students and faculty involved in the examination processes.² This measure aimed to secure the online exam environment, ensuring that only authorized candidates could access and complete the assessments. All these challenges underscore the multifaceted nature of the faculty's responsibilities during the transition to online assessment. While the efforts put forth by faculty and staff are commendable in adapting to the new normal, they highlight the need for ongoing support, training, and streamlined processes to facilitate a smoother integration of online assessment tools in educational settings. Addressing these challenges is crucial to optimizing the efficiency and effectiveness of online assessment methods in the future. Despite the myriad challenges faced by students in the online examination format, they also articulated positive perspectives on this mode of assessment. Students highlighted that once they became acquainted with the examination process, their stress levels diminished, and they felt more at ease. This sense of comfort was particularly notable after the pilot run of the assessment, especially in the formative type preceding the summative type. During formative assessments, students received immediate feedback from facilitators. This not only served as motivation but also provided valuable guidance for enhancing their performance in preparation for the summative examination.⁸ An additional strength identified by students lies in the transparency of online

formative examinations. The marking process can be scrutinized by referring to the available key, offering a clear and easily traceable evaluation.⁶ This transparency not only facilitates tracking but also provides valuable insights that guide students in their preparation for the subsequent summative examination. A critical appraisal of these strengths underscores the potential benefits of online assessment from a student's perspective. The reduction in stress levels and the availability of immediate feedback contribute positively to the learning experience. The transparency in marking adds an element of accountability and guidance for improvement. While acknowledging these strengths, it is imperative to continually refine online assessment modalities to capitalize on these positive aspects and address any lingering challenges for a more robust and effective evaluation process.

Like students, faculty and IT staff delineated several advantages associated with online assessment, offering insights into the benefits of this mode of evaluation. One prominent strength highlighted was the diminished marking load on staff, achieved through the automation of the process by online software. This not only streamlined administrative tasks but also contributed to increased efficiency. Following Formative assessments, conducted synchronously, faculty members provided direct feedback to students, akin to face-to-face interaction. This direct and immediate feedback proved instrumental in aiding students to recognize and rectify mistakes, thereby facilitating their preparation for subsequent summative examinations. Furthermore, this interactive element helped faculty address student queries regarding exam questions and provided justifications for key answers. The online platform facilitated accessibility to students' results for faculty, offering a convenient and centralized system for review purposes. This digital availability eased administrative processes and provided a mechanism for case reviews. The comprehensive recording of the entire examination process, overseen by IT staff, emerged as another notable strength. These recordings, accessible to stakeholders at any time, promoted transparency and fairness in the examination process. Importantly, this feature contributed significantly to reducing the likelihood of academic dishonesty, as the entire class was concurrently monitored by both examiners and administrative staff.⁸ These strengths underscore the transformative impact of online assessment on the efficiency and effectiveness of the evaluation process.

The automation of tasks not only lightens the workload but also allows for a more focused and personalized approach to student feedback. Continued refinement and adaptation of these strengths are crucial for optimizing the benefits of online assessment in the realm of medical education. This understanding provides a foundation for developing strategies to address these gaps, ensuring a more effective and equitable online assessment experience for students.

This scoping review offers a summary of accessible literature, acknowledging a limitation in its inability to include articles that aren't openly accessible. The unavailability of full-text articles due to being paid versions restricts the scope of the literature that can be evaluated.

5. Conclusion

The critical evaluation of challenges and strengths in online assessments within the medical education landscape underscores the importance of continuous improvement, adaptability, and the integration of technology to create an effective and equitable evaluation environment for both students and faculty. The ongoing refinement of online assessment modalities is essential to harness their full potential in advancing medical education.

In light of the innovative role of online assessment in recent years, this scoping review serves as a valuable resource for institutions seeking to leverage digital platforms for teaching and evaluation. To realize the full potential of online courses, institutes are encouraged to proactively devise solutions for the challenges identified in this review before initiating their virtual programs. Recognition of the inseparable connection between assessment and the teaching-learning process is crucial. Planned and strategic assessment practices not only serve as a means of gauging learning but also play a pivotal role in motivating students, instilling confidence, and nurturing critical and analytical thinking skills, especially in challenging circumstances. This underscores the transformative importance of online assessment as an integral component of modern education, offering flexibility and accessibility while upholding rigorous standards of evaluation.

CONFLICTS OF INTEREST- None

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Contributions:

H.F, M.N, A.R, H.S, S.I, M.F.S - Conception of study

H.F, M.N, A.R, H.S, S.I, M.F.S -
Experimentation/Study Conduction
H.F, M.N, A.R, H.S, S.I, M.F.S -
Analysis/Interpretation/Discussion
H.F, M.N, A.R, H.S, S.I, M.F.S - Manuscript Writing
H.F, M.N, A.R, H.S, S.I, M.F.S - Critical Review
H.F, M.N, A.R, H.S, S.I, M.F.S - Facilitation and
Material analysis

All authors approved the final version to be published
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